



NTSB National Transportation Safety Board

The Role of Industry-Level Safety Culture in

Accident Investigations

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Executive Summary

- 1990's: Accident investigators began looking beyond “human error” to consider the role of **corporate** safety culture in accidents and the role of corporate leadership in helping to create a positive safety culture
- Today: Accident investigators should also consider the role of **industry** safety culture in accidents and the role of the industry “leader,” i.e., the regulator, in helping to create a positive industry safety culture

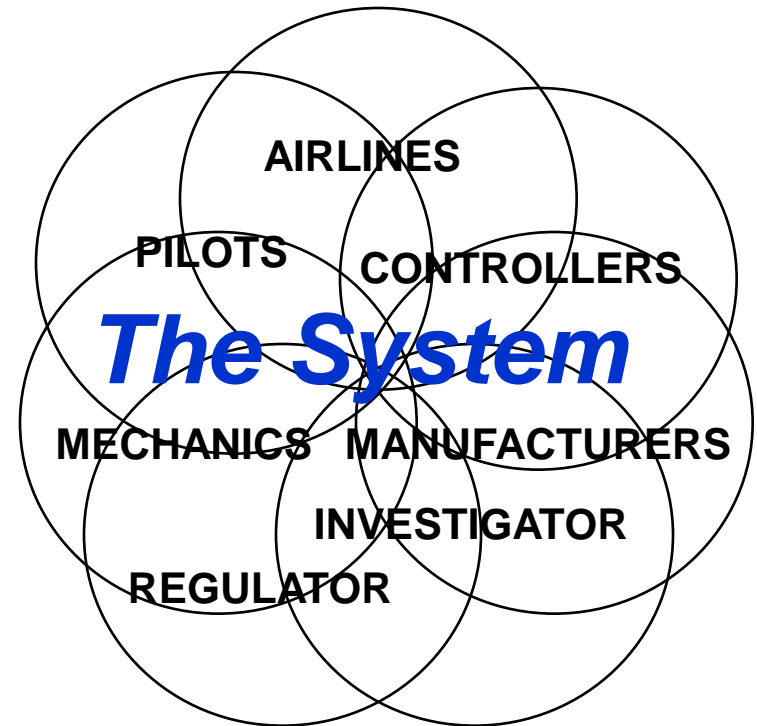
The Challenge: Human Error in Complex Systems

- Error by which human?
 - Operator (e.g., pilot, controller)
 - Designer of components
 - Manufacturer of components
 - Maintainer of components
 - Designer of system
 - Integrator of system
 - Regulator
- Bottom line: Human error is **100% cause of mishaps** – not just **60-70%**



The Context: Increasing Complexity

- **More System**
Interdependencies
 - Large, complex, interactive system
 - Often tightly coupled
 - Hi-tech components
 - Continuous innovation
 - Ongoing evolution
- **Safety Issues Are More Likely to Involve**
Interactions Between Parts of the System



Effects of Increasing Complexity:

More “Human Error” Because

- **System More Likely to be Error Prone**
- **Operators More Likely to Encounter Unanticipated Situations**
- **Operators More Likely to Encounter Situations in Which “By the Book” May Not Be Optimal (“workarounds”)**



The Result:

Front-Line Staff Who Are

- **Highly Trained**
- **Competent**
- **Experienced,**
- **Trying to Do the Right Thing, and**
- **Proud of Doing It Well**

. . . Yet They Still Commit

**Inadvertent
Human Errors**



The Solution: System Think

***Understanding how a
change in one subsystem
of a complex system may
affect other subsystems
within that complex system***

“System Think” via Collaboration

Bringing all parts of a complex system together to collaboratively

- **Identify potential issues**
- ***PRIORITIZE* the issues**
- **Develop solutions for the prioritized issues**
- **Evaluate whether the solutions are**
 - **Accomplishing the desired result, and**
 - **Not creating unintended consequences**

When Things Go Wrong

How It Is Now . . .

You are highly trained

and

If you did as trained, you
would not make mistakes

so

You weren't careful
enough

so

You should be **PUNISHED!**

How It Should Be . . .

You are human

and

Humans make mistakes

so

Let's *also* explore why the
system allowed, or failed to
accommodate, your mistake

and

Let's **IMPROVE THE SYSTEM!**

Fix the Person or the System?

Is the **Person**
Clumsy?

Or Is the
Problem . . .

The **Step???**



Enhance Understanding of Person/System Interactions By:

- Collecting,**
 - Analyzing, and**
 - Sharing**
- # **Information**

Major Source of Information: Hands-On “Front-Line” Employees*

**“We Knew About
That Problem”**

***(and we knew it might hurt
someone sooner or later)***

**** But not if they are concerned that they may be punished***

Objectives:

Make the System

***(a) Less
Error Prone***

and

***(b) More
Error Tolerant***

From Data to Information

Tools and processes to convert large quantities of data into useful information

Data Sources

Info from front line staff and other sources

DATA



Analysts

USEFUL

INFORMATION

Smart Decisions

- Identify issues
- **PRIORITIZE!!!**
- Develop solutions
- Evaluate interventions

Tools

Processes



Alternative Solution: Punishment?

- **Good employees**
 - Trying to get the job done better, faster, cheaper
 - Punishment is probably not helpful, possibly harmful
- **Bad employees**
 - Don't like to follow rules
 - Best remedy is removal



The Health Care Industry

To Err Is Human:

Building a Safer Health System

“The focus must shift from blaming individuals for past errors to a focus on preventing future errors by designing safety into the system.”

Institute of Medicine, Committee on Quality of Health Care in America, 1999



Safety Culture at the Industry Level

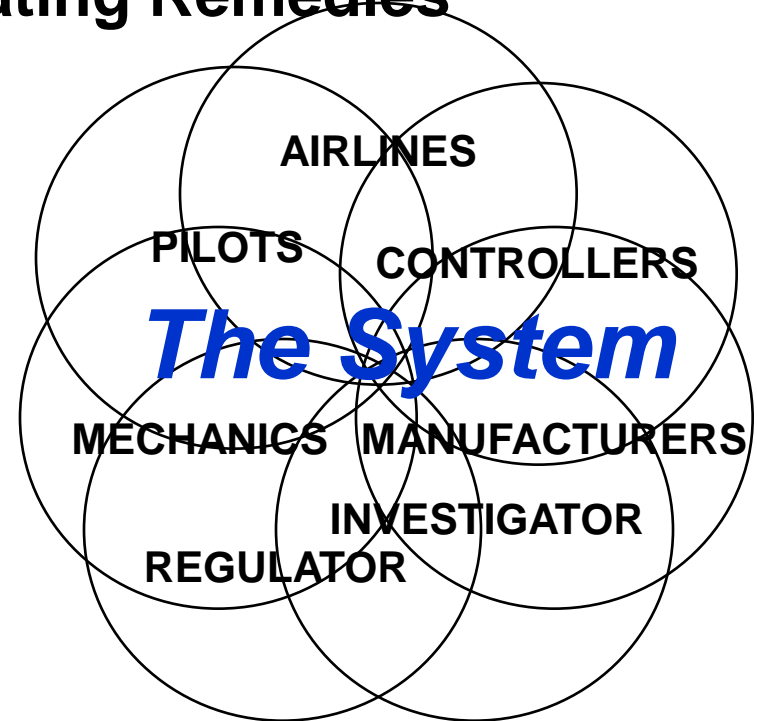
***Recognition that improving
safety at the industry level is
a system challenge, and
system challenges demand
system solutions***



U.S. Commercial Aviation Safety Team (CAST) “System Think” Process

- Engage All Participants In Identifying Problems and Developing and Evaluating Remedies

- Airlines
- Manufacturers
 - *With the systemwide effort*
 - *With their own end users*
- Air Traffic Organizations
- Labor
 - *Pilots*
 - *Mechanics*
 - *Air traffic controllers*
- Regulator(s) [Query: Investigator(s)?]



CAST Success Story

83% Decrease in Fatal Accident Rate,
1998 - 2008

largely because of
System Think

fueled by
***Proactive Safety
Information Programs***

P.S. Contrary to conventional wisdom, they
simultaneously improved productivity!



Moral of the Story

Anyone who is
involved in the *problem*
should be involved in
developing the *solution*

Collaboration: A Major Paradigm Shift

- **Old: Regulator identifies a problem and proposes solutions**
 - Industry skeptical of regulator's understanding of the problem
 - Industry resists regulator's solutions and/or implements them begrudgingly
- **New: Collaborative “System Think”**
 - Industry involved in identifying problem
 - Industry “buy-in” re interventions because everyone had input, everyone's interests considered
 - Prompt and willing implementation
 - Interventions evaluated . . . *and tweaked as needed*
 - Solutions probably more effective and efficient
 - Unintended consequences much less likely



Challenges of Collaboration

- Human nature: “I’m doing great . . . *the problem is everyone else*”
- Differing and sometimes competing interests
 - Labor-management issues
 - May be potential co-defendants
- Regulator probably not welcome
- Not a democracy
 - Regulator must regulate
- Requires all to be willing, in their *enlightened self-interest*, to leave their “comfort zone” and think of the System



The Role of Leadership

- Demonstrate safety commitment . . .
but acknowledge that mistakes will happen
(e.g., goal is *continuous improvement* rather than *more punishment*)
- Include “us” (e.g., system) issues
not just “you” (e.g., training) issues
- Make safety a middle management metric
 - Engage labor early
- Include everyone with a “dog in the fight” --
manufacturers, operators, regulator(s) and others
- Encourage and facilitate reporting
 - Provide *feedback*
 - Provide adequate *resources*
 - *Follow through* with action



How The Regulator Can Help

- Demonstrate safety commitment
(through goal of *continuous improvement* rather than *more punishment*)
- Emphasize the importance of System issues *in addition to* (not instead of) worker issues
- Encourage and participate in industry-wide “System Think”
- Facilitate collection and analysis of information
 - Clarify and announce *policies for protecting information and those who provide it*
 - Encourage other industry participants to do the same

Conclusions

- Safety culture is important not only at the individual organization level, but also at the industry level***
- Organizational leaders must demonstrate commitment to safety for organization-level safety culture; and the industry “leader,” i.e., the regulator, must demonstrate commitment to safety for industry-level safety culture***
 - Safety programs that improve the bottom line are more likely to be sustainable***



Thank You!!!



Questions?